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Reza Abbaschian - 2006 President of, ASM International

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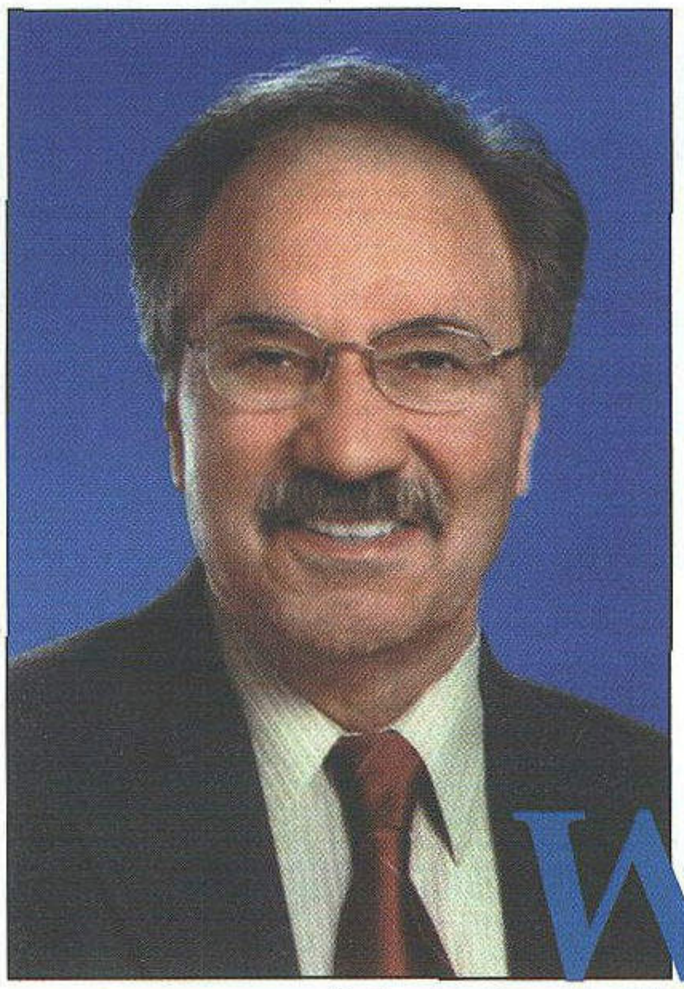

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2006 President of ASM International

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We are privileged to have Reza Abbaschian as the incoming president at ASM International. Exciting opportunities for ASM and its affiliate societies are emerging as the field of materials science and engineering evolves ever more rapidly. This transformation calls for the kind of dynamic leadership that will be provided by Dr. Reza Abbaschian, a respected colleague for over 25 years.

I would like to introduce Reza as I know him, and to highlight the character of the person who will be leading our Society. Several quotes capture the essence of Reza Abbaschian:

"The task of the leader is to get his people from where they are to where they have not been."
— Henry Kissinger

"The older I get the less I listen to what people say and the more I look at what they do."
— Andrew Carnegie

"The first responsibility of a leader is to define reality. The last is to say thank you. In between, the leader is a servant."
— Max DePree

A visionary, a doer, and a servant describe well Reza's style. A look at his accomplishments at the University of Florida since 1981 is a testimonial to these three attributes. Since September 2005 he has been Dean of the Bourns College of Engineering (BCOE) at the University of California at Riverside.

Educator and leader

Reza Abbaschian received his Ph.D. in Materials Science and Engineering from the University of California, Berkeley in 1971, MS Degree in Metallurgical Engineering from Michigan Technological University in 1968, and B.Sc. in Mining and Metallurgy from Tehran University in 1964.

He served on the faculty of the University of Florida from 1981 to 2005, and was Chairman of the Department of Materials Science and Engineering from 1986 until May 2002. Before joining UF, he was Chairman at the Pahlavi University, Shiraz, Iran; Visiting Associate Professor at the University of Illinois; and Visiting Scientist at the Massachusetts Institute of Technology. He has published more than 220 scientific papers on subjects ranging from metal processing, crystal growth, solidification, and composites, to phase diagrams. He also has four patents and eight books, and was co-author of the Third Edition of the *Physical Metallurgy Principles*, a textbook widely used throughout the world.

As Chairman of the MSE Dept. of UF for 16 years, he was responsible for planning, supervision, and administration of one of the largest materials science departments in the nation. This department has broad-based educational and research programs covering the entire materials spectrum, from biomaterials to metals, ceramics, polymers, minerals, electronics, and optoelectronics. Under his chairmanship, the department moved to the top ten in the *US News and World Report* rankings for both graduate and undergraduate education, and grew to over $12M in annual research expenditures, 32 faculty members, over 35 research staff, 230 graduate students, and 100 seniors and juniors. The department also housed several multidisciplinary research centers, such as the Biomedical Engineering Center, Mineral Resources Research Center, Plastics Properties and Processing Center, and the Major Analytical Instrumentation Center.

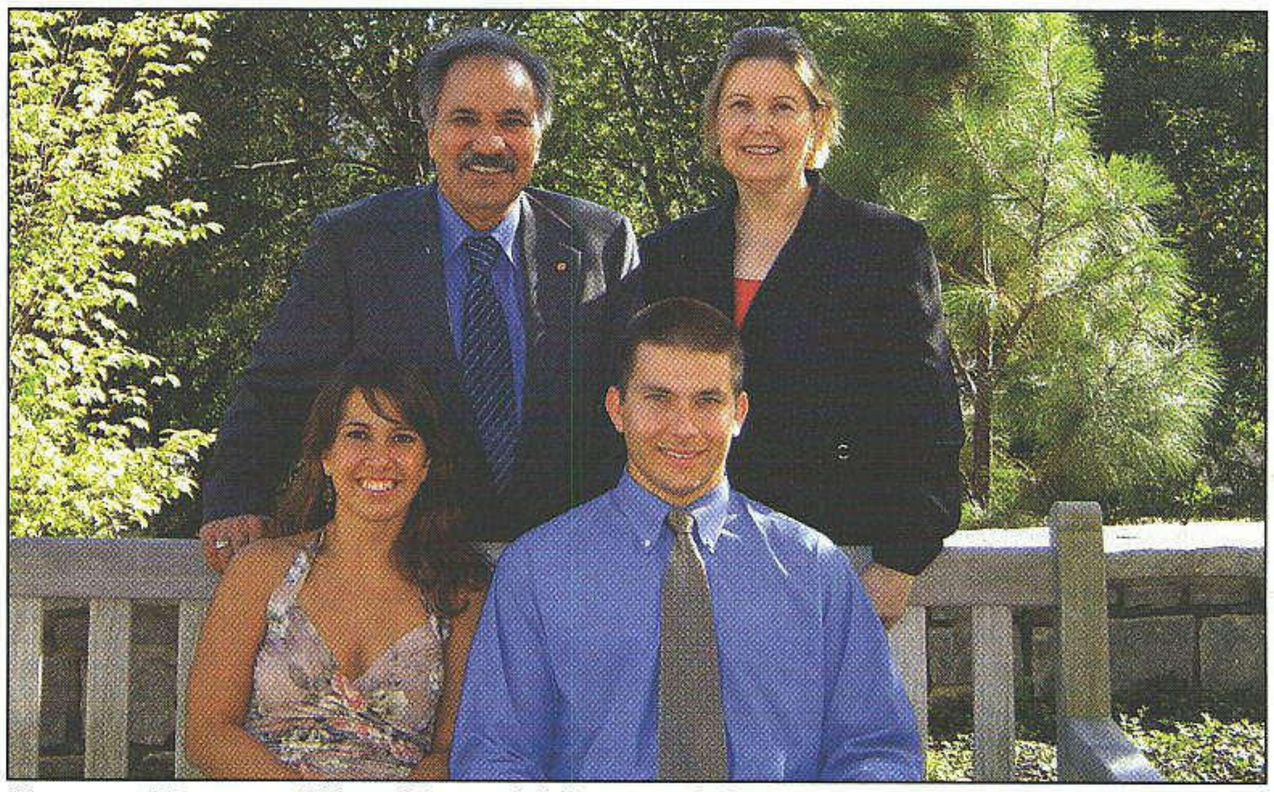
Reza's contributions go beyond formal classroom teaching. He has been active in promoting engineering education through his activities in a variety of professional organizations and societies, the NMAB, NRC panels, and study groups. For example, he organized a symposium on "Workforce and Education Issues in Materials Science and Engineering" in 2003, and was co-organizer of another symposium on "The Future of Materials Science and Engineering Education" in 2004. His views on materials education and curriculum development have been published in journals such as Materials Research Society Bulletin, and most recently in *Facets* in 2004. In recognition of his outstanding contributions, he received the ASEE Donald E. Marlowe Award in 2003. He also received the TMS Educator Award in 1998.

A scholar and innovator

Reza Abbaschian is a nationally and internationally recognized researcher and educator who has contributed extensively to the field of materials processing and solidification. His research programs include interfacial kinetics, containerless processing, phase diagrams, encapsulated float zone growth, high temperature intermetallic composites, reactive hot compaction, axial heat processing of semiconductors and superalloys, and high temperature/high pressure growth of diamonds.

An emphasis of his research has been on the fundamental understanding of the role of interfaces on the processing and properties of materials. His research on interfacial kinetics during solidification has dealt with the atomic processes taking place at the solid-liquid (S/L) interface, particularly as applied to facet-forming materials.

He has utilized novel non-intrusive techniques to accurately determine the S/L interface temperature as a function of the growth rate, interface perfection, and crystal orientation. This work has provided the most accurate and reliable kinetic data to date and new insight into different growth mechanisms of faceted S/L interfaces. More importantly, he has shown that faceted interfaces become kinetically roughened as interface growth rate and/or supercooling increases, and that the step free energy becomes vanishingly small after roughening.



Reza and Janette Abbaschian with Lara and Cyrus.

Single crystals and microgravity

More recently, he has applied the kinetics understanding of faceted interfaces to the growth of diamond single crystals at high pressures and high temperatures. This has led to the commercial production of diamond gemstones by Gemesis Corporation.

Reza has also utilized microgravity experiments to demonstrate that kinetics and anisotropy play a major role in stabilizing plane front growth in faceted alloys, and that the kinetic stabilization effects are far greater than those theoretically predicted.

Four of his experiments have flown on the Space Shuttle. Two of them involved design and development of a Liquid Encapsulated Melt Zone (LEMZ) technique for growing compound single crystals in space. The technique represents the first demonstration of LEMZ in space.

The other two dealt with the solidification kinetics of Bi-Sn alloys. The flight experiments involved an extensive collaborative effort between the University of Florida, NASA, Dornier Deutsche Aerospace Company, Canadian Space Agency, University of Freiburg, CREM (France), CNES (France), NASA-Lewis, and University of New South Wales in Australia.

Processing techniques

His most recent solidification research involves a novel Axial Heat Processing Technique (AHP) to investigate morphological stability of faceted solid/liquid interfaces. The AHP technique, which has been developed in collaboration with Russian scientists, allows for the control of interfacial morphology and microsegregation by reducing the amount of natural convection near the S/L interface. The AHP technique has been used for growth of Ge-based semiconductor materials as well as growth of high temperature superalloy single crystals.

His research also has emphasized the development of a reactive hot compaction process for intermetallics that allows stable coatings. His most recent work involves processing of functionally gradient materials with improved toughness for high temperature applications.

Service to community

Reza has contributed extensively in the service arena, both at the University of Florida and nationally, and now at UC Riverside. Reza has also been active in other national educational and professional organizations, including National Materials Advisory Board, NASA Space Station Users Advisory Committee, ASM Board of Trustees, USRA Board of Trustees, TMS Board of Directors, Trustee of Federation of Materials Societies, NSF-Materials Research Advisory Committee, Statewide Coordinator for DARPA-AMMP for High Temperature Composites, and Chairman of the University Materials Council. He received the TMS Leadership Award in 1999 for his outstanding contribution to the materials profession. He was elected as Fellow of ASM in 1992, and became a Fellow of TMS in 2000.

The Abbaschian family

The Abbaschian family is a loving family, dedicated to each other, caring, and very gracious. Reza and Janette are the proud parents of Cyrus and Lara, who are accomplished in their own right and are wonderful young people. Our incoming President will have the full support of his family, who will be incredible ambassadors for ASM International. As one ASM International member, I am excited about what is ahead for our Society—we will be guided and led by a wise and experienced colleague, a man with tremendous insight and vision, and a man who will make a difference. We will have a great journey together.